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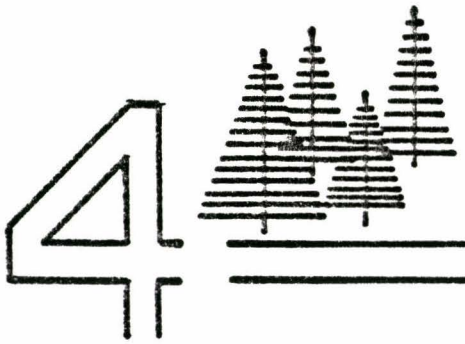

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ATTRACTION AND CONTAINMENT OF *IPS* BEETLES BY LARGE SLASH PILES

By

Jerry A. E. Knopf[1]

ABSTRACT

Under certain conditions, ponderosa pine stands in southern Idaho are susceptible to heavy damage from engraver beetles, *Ips* spp. Natural damage and man's management activities in these stands have repeatedly triggered population buildups with subsequent tree mortality. Suppression techniques have varied from the use of chemical pesticides to restriction of logging at certain times of the year through a special clause modifying timber sale contracts. This evaluation reports attraction and containment of *Ips* beetles in over-size slash piles created when ponderosa pine stands were logged using a Hahn Harvester. Engraver beetle attacks in residual stands were minimized and/or virtually eliminated when two generations of beetles remained in large slash piles.

INTRODUCTION

For many years, resource managers and forest entomologists have been confronted with the problem of keeping *Ips* spp. damage to minimum levels while managing ponderosa pine stands. This is particularly true where early season logging is done. Early on, infested slash and cull pieces were sprayed with a mixture of Lindane[R] and diesel oil. This procedure satisfactorily suppressed pine engraver beetle populations, however, it was time consuming, costly, and mildly hazardous to the chemical applicators.[2]

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[1] Entomologist, Boise Field Office, Boise, Idaho.

[2] Ortho ISOTOX[R] Lindane Spray No. 200. EPA Reg. No. 239-2363-AA, Form 8145-E, Product 1127. See label for specifics.

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EXPERIMENT STATION

Eventually the C6.415 special clause was developed for inclusion in standard timber sale contracts. This clause restricts logging during critical *Ips* buildup periods. Use of the clause has been generally effective in suppressing *Ips* buildups. However, use has two drawbacks: (1) early season entry into ponderosa pine stands is prevented, thus shortening the logging season; and (2) additional workload for timber sale administrators is created.

The Hahn Harvester system creates exceptionally large slash piles since whole trees are processed at centralized landings. It was theorized that large ponderosa pine slash piles might become effective attraction/containment sources for engraver beetles since no attractive slash is left in the woods. Due to the large size of the Hahn-created slash piles, slash pieces on the interior of the piles remain moist for extended periods. *Ips* could be attracted for two or more generations. If the slash piles proved to be effective attraction/containment sources for *Ips* populations, another management tool would be available for integration into the forest resource management system.

The Hahn Harvester System

This system consists of a "shear cat" which is a crawler tractor fitted with a set of hydraulically actuated cutting shears. The machine moves up to a tree, grabs it with a pair of claws, and shears the tree off close to ground level. The shear cat moves away from the stump and deposits the whole tree on the ground. Rubber-tired skidders gather the sheared trees and transport them to a landing for processing with the Hahn Harvester. This machine is a 45,000 lb., self-propelled limber-bucker. Whole trees are picked up and fed by carriage through de-limbing knives. A cut-off saw lops the boles into pre-selected lengths.

This operation concentrates lopped tops, limbs, and cull-pieces of slash up to 6" diameter at centralized locations. Resultant slash piles are quite large, i.e., 80-100 ft. long, 30 ft. wide, and 15-20 ft. high.

Opportunity to Evaluate Attraction/Containment of *Ips* in Slash Piles

Hahn Harvester operations started in November 1980 and extended through late December 1980 on the Calf Pen Timber Sale, Council Ranger District, Payette National Forest. Logging resumed in mid-May 1981 and was terminated on July 23, 1981. During these periods, many slash piles were created adjacent to residual ponderosa pine stands. The stage was set to evaluate whether or not slash piles would attract and contain engraver beetle populations.

OBSERVATIONS AND FINDINGS

May 5, 1981

At this date, no logging had occurred in 1981, however, late season logging in November and December 1980 had created many large slash piles which had not been burned. Winter snows had kept moisture levels fairly high in the piles. The slash was attracting adult *Ips* beetles. Most attacks were occurring inward two to three feet from the exposed ends of slash pieces.

Wherever bark was removed, the nuptial chamber was completed, and extension of galleries was in progress. Some eggs were being laid, but first instar larvae were not present.

May 21, 1981

The same series of slash piles that were visited and sampled on May 5, 1981, were reevaluated on this date. Attack intensities had increased from those observed on May 5, 1981, and gallery extension was complete. Healthy larval broods were present, and some pre-pupal larvae were also found. Although definitive measurements had not been made previously (May 5, 1981), *Ips* had progressed an additional two to three feet into the piles. Attack densities were subjectively classed as moderate to heavy.

June 23, 1981

Once again the same series of slash piles examined in May were visited to observe *Ips* activity. Also, Hahn Harvester operations had been conducted since mid-May, and fresh piles were available for observation.

Several slash pieces were winched out of the older (1980) slash piles and examined for *Ips* activity. Suprisingly, portions that had been near the center of the piles were still moist, and the cambium had not sour-sapped. First generation *Ips* were vigorously attacking and establishing healthy broods.

Evidence of *Ips* attacks to the moist center pieces in the slash piles suggested that each pile was acting as a "population sink," and emerging adults were simply attacking deeper into the piles. This in turn suggested that damage to nearby, residual, standing trees would be minimal.

Fresh, current season (1981) piles were examined, and only light *Ips* attacks were occurring in their periphery. This light attack pattern might have been due to the proximity of the old slash piles, which were containing emerging adult populations, and of freshly felled (within two weeks) whole, green trees.

August 26, 1981

Both the old (1980) slash piles and those generated in 1981 were examined.

Slash and cull pieces were winched out of the 1980 slash piles, and bark patches removed. All pieces sampled had dried to the extent that no living brood was found. There was some evidence that emerging, second generation adults had made very light and widely scattered attacks on slash pieces that were innermost in the piles. Due to drying of the relatively small diameter pieces, broods did not reach maturity and emerge. This was based on the observation that no exit holes were found in the bark surface below adult and larval mines.

The 1981 slash piles exhibited varying degrees of attack intensities from second and third generation adult *Ips*. Overall attacks by second generation *Ips* were light. Adult galleries were widespread and did not show "crowding" which is characteristic of heavy attacks. Emerging adults, instead of attacking residual trees, moved inward and attacked uninfested material toward the piles' interiors. This was verified by winching out slash pieces and removing patches of bark for observation.

As a follow-up to monitoring *Ips* activities in slash piles, a ground survey was conducted to detect fading trees in ponderosa pine stands throughout units logged by the Hahn Harvester system. No *Ips*-attacked, standing trees were found. In addition, a surveillance flight was made in early September 1981 which revealed no fading of either groups or single trees.

DISCUSSION

It now appears that early season logging using a Hahn Harvester system in ponderosa pine stands can minimize *Ips* damage to residual stands. The oversized slash piles apparently provide a mechanism of attraction/containment of *Ips* populations. This finding affords the resource manager a greater degree of operating freedom for application of cultural practices to ponderosa pine stands.

The concept of using the Hahn Harvester system for early season operations, with resultant protection from *Ips* damage needs further field tests. A more definitive evaluation procedure should be developed to measure attraction/containment potential of Hahn-created slash piles with regard to managing engraver beetles.

If the Hahn Harvester-created slash piles continue to provide minimal damage from *Ips* buildups, resource managers can look forward to early season logging entries into ponderosa pine areas. This would also help reduce administrative costs imposed when the C6.415 special clause is used.